

WHAT IS CLAIMED IS:

1. A method for forming a composite product, the method comprising:
 - providing a projection component comprising discrete projections of resin extending from a surface of a base;
 - 5 locally heating distal ends of the projections;
 - foreshortening the projections; and
 - applying a preformed substrate to the distal ends to bond the preformed substrate and projection component.
- 10 2. The method of claim 1, wherein the preformed substrate is bonded to resin of the distal ends without use of an adhesive.
3. The method of claim 1, wherein the step of applying the preformed substrate includes pressing the preformed substrate against the heated distal ends.
- 15 4. The method of claim 3, wherein pressure applied to the preformed substrate is between about 1 N/cm² and about 100 N/cm².
5. The method of claim 3, wherein pressure is applied by a pair of pressure rolls.
- 20 6. The method of claim 1, wherein the step of applying the preformed substrate includes encapsulating fibers of the preformed substrate with thermoplastic resin.
7. The method of claim 1, wherein the distal ends are heated to a temperature greater than
25 that of the preformed substrate.
8. The method of claim 1, wherein the step of foreshortening the projections occurs while applying the preformed substrate.

9. The method of claim 1, wherein the step of foreshortening the projections occurs prior to applying the preformed substrate.

10. The method of claim 1, wherein the step of foreshortening the projections occurs
5 subsequent to applying the preformed substrate.

11. The method of claim 1, wherein the projections include heads that extend radially outward in one or more discrete directions.

10 12. The method of claim 1, wherein the projections include heads that extend radially outward in multiple directions.

13. The method of claim 1, wherein the distal ends are heated by a non-contact heat source.

15 14. The method of claim 13, wherein the non-contact heat source is one of flame, electrically heated nichrome wire, and radiant heater blocks.

15. The method of claim 1, wherein the preformed substrate is selected from a group consisting of films, woven materials, paper, thermoplastic sheet, non-woven web of fibers
20 and mesh materials.

16. The method of claim 1 further including:

continuously introducing molten resin to a gap defined adjacent a periphery of a rotating mold roll, such that the resin forms at least a part of the base of the projection
25 component at the periphery of the mold roll and fills an array of fixed cavities defined in the rotating mold roll to form the projections;

solidifying the resin; and

stripping the resin from the periphery of the mold roll by pulling the solidified projections from their respective cavities.

17. The method of claim 16, wherein the projections are integrally molded with the base.

18. The method of claim 1, wherein the preformed substrate comprises a different material than the projections:

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19. The method of claim 18, wherein the preformed substrate has a higher softening point than the projections.

20. The method of claim 1, wherein the preformed substrate comprises less than about 40 percent of a total thickness of the composite.

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21. The method of claim 20, wherein the preformed substrate comprises less than about 20 percent of a total thickness of the composite.

22. The method of claim 1, wherein applying the preformed substrate includes bonding the preformed substrate to the distal ends of the projections in discrete bonding zones that are spaced-apart from the base.

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23. The method of claim 22 further comprising removing the preformed substrate from the distal ends.

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24. The method of claim 23, wherein the step of applying the preformed substrate includes bonding a material carried by the substrate to the distal ends of the projections.

25. The method of claim 24, wherein the material is selected from a group consisting of pigments, sand, silicone, fiberglass and paints.

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26. The method of claim 23, wherein the step of removing the preformed substrate leaves an imprint within resin of the distal ends of the projections.

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27. The method of claim 23, wherein the step of removing the preformed substrate comprises manually removing the preformed substrate.

28. The method of claim 1, wherein applying the preformed substrate to the distal ends to
5 bond the preformed substrate includes contacting the base with the preformed substrate.

29. A method for forming a composite, the method comprising:

providing a projection component comprising projections extending from a surface of
a base;

10 applying a preformed substrate to the base such that at least one projection extends
through the preformed substrate; and

post-forming the at least one projection to affix the preformed substrate to the base.

30. The method of claim 29, wherein the step of post-forming includes locally heating a
15 distal end of the at least one projection.

31. The method of claim 30, wherein the step of heating includes encapsulating fibers of the
preformed substrate with material forming the projections.

20 32. The method of claim 29, wherein the step of post-forming the at least one projection
includes deforming a distal end of the at least one projection to form a head that
overhangs the base.

33. The method of claim 32, wherein the head extends radially outward in multiple
25 directions.

34. The method of claim 32, wherein the head of the at least one projection is sized to engage
loops of a loop material.

35. The method of claim 32, wherein the head of the at least one projection extends radially outward in one or more discrete directions.

36. The method of claim 29, wherein the step of post-forming includes contacting a distal
5 end of the at least one projection with a contact surface.

37. The method of claim 29, wherein the preformed substrate is selected from a group consisting of films, woven materials, nonwoven materials, paper, thermoplastic sheet and mesh materials.

38. The method of claim 29 further including a method of forming the projection component comprising:

continuously introducing molten resin to a gap defined adjacent a periphery of a rotating mold roll, such that the resin forms at least a part of the base of the projection
15 component at the periphery of the mold roll and fills an array of fixed fastener element cavities defined in the rotating mold roll to form the projections;

solidifying the resin; and

stripping the resin from the periphery of the mold roll by pulling the solidified projections from their respective cavities.

39. A method for forming a composite having fastener elements comprising stem portions integrally molded with and extending from a sheet-form resin base and loop-engageable head portions, the method comprising:

applying a preformed substrate to the stem portions forming an intermediate product
25 having stem portions projecting through the preformed substrate and beyond an outer surface of the preformed substrate;

heating the distal ends of the stem portions; and

deforming the distal ends of the stem portions to form the head portions overhanging the sheet-form base.

40. The method of claim 39, wherein the head portions extend radially outward in one or more discrete directions.

41. The method of claim 39, wherein the head portions extend radially outward in multiple directions.

42. The method of claim 39, wherein the preformed substrate is a nonwoven material.

43. The method of claim 39, wherein the preformed substrate is a woven material.

44. A method for forming a continuous composite having fastener elements comprising head portions and stem portions that are integrally molded with and extend from a surface of a sheet-form resin base, the method comprising:

continuously introducing a molten resin to a gap defined adjacent a periphery of a rotating mold roll, such that the resin forms at least a part of the base at the periphery of the mold roll and fills an array of fixed cavities defined in the rotating mold roll to form at least the stem portions of the fastener elements;

solidifying the resin;

stripping the resin from the periphery of the mold roll by pulling the solidified resin from their respective cavities; and

applying a preformed substrate to the stem portions forming an intermediate product having a plurality of stem portions projecting through the preformed substrate and extending beyond an outer surface of the preformed substrate.

45. The method of claim 44 further including post-forming a distal end of the plurality of stem portions to form fastener elements having head portions that overhang the base.

46. The method of claim 45, wherein the head portions extend radially outward in multiple directions.

47. The method of claim 45, wherein the fixed cavities are hook-shaped to form hook-shaped head portions extending radially outward in one or more discrete directions integrally molded with the stem portions.
- 5 48. The method of claim 44 including encapsulating fibers of the preformed substrate with resin of the fastener elements.
49. A composite comprising:
 a projection component having an array of molded projections of resin extending from
10 a surface of the projection component; and
 a preformed substrate having a surface that is bonded to resin of distal ends of the projections.
50. The composite of claim 49, wherein the preformed substrate comprises a different
15 material than the projections.
51. The composite of claim 49, wherein the preformed substrate is bonded to resin of the distal ends without use of an adhesive.
- 20 52. The composite of claim 49, wherein the preformed substrate is selected from a group consisting of films, woven materials, paper, thermoplastic sheet, nonwoven materials and mesh materials.
53. The composite of claim 49, wherein the preformed substrate comprises a material
25 selected from a group consisting of plastic, metal, and wood.
54. The composite of claim 49, wherein the projections include head portions that extend radially outwardly in multiple directions.

55. The composite of claim 49, wherein the projections include head portions that extend radially outwardly in one or more discrete directions.

56. The composite of claim 49, wherein the preformed substrate is non-porous.

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57. The composite of claim 49, wherein the preformed substrate is porous.

58. The composite of claim 49, wherein the preformed substrate is bonded within discrete bonding zones that are spaced-apart from the surface of the projection component.

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59. The composite of claim 58, wherein the preformed substrate is removable from the distal ends of the projections.

60. The composite of claim 58, wherein the preformed substrate includes a material carried by the preformed substrate deposited within resin of the projections.

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61. The composite of claim 58, wherein the material carried by the preformed substrate is selected from a group consisting of pigments, sand, silicone, fiberglass and paints.

62. The composite of claim 58 further comprising an intermediate material positioned between the preformed substrate and the surface of the projection component.

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63. The composite of claim 62, wherein the intermediate material is selected from a group consisting of gas, non-wovens and wovens.

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64. The composite of claim 62, wherein the intermediate material is fastener element-engageable.

65. The composite of claim 49, wherein the preformed substrate contacts the surface from which the projections extend.

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66. The composite of claim 49, wherein the preformed substrate comprises at most about 40 percent of a total thickness of the composite.

67. A composite comprising:

5 a projection component having an array of projections comprising a head portion and a stem portion forming fastener elements extending from a surface of the projection component; and

 a preformed substrate bonded to the projection component, the fastener element stem portions extending into the preformed substrate.

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68. The composite of claim 67, wherein the head portion overhangs the projection component.

69. The composite of claim 68, wherein the head portion extends radially outward in multiple
15 directions.

70. The composite of claim 67, wherein the head portion overhangs the preformed substrate.

20 71. The composite of claim 70, wherein the head portion is sized to trap the second preformed substrate adjacent to the first preformed substrate.

72. The composite of claim 67, wherein the head portion is arranged to engage loops of a loop material.

25 73. The composite of claim 67, wherein the fastener elements comprise thermoplastic resin.

74. The composite of claim 73, wherein thermoplastic resin of head portions encapsulate fibers of the preformed substrate.

75. The method of claim 67, wherein the preformed substrate is selected from a group consisting of woven materials, non-woven materials and mesh materials.

76. A method of preventing releasable fastening of a fastener product, the method comprising:

providing a projection component comprising a first array of fastener elements having stems extending from a first broad surface of a base;

attaching a preformed substrate to heads of the first array of fastener elements to bond the preformed substrate to the projection component within discrete bonding zones spaced-apart from the first broad surface of the base;

attaching a second array fastener elements to an opposite, second broad surface of the projection component, the second array of fastener elements capable of releasable engagement with the first array of fastener elements; and

positioning the second array of fastener elements adjacent the preformed substrate, the preformed substrate providing a barrier between the first and second array of fastener elements.

77. The method of claim 76, wherein the step of positioning the second array of fastener elements adjacent the preformed substrate comprises rolling the fastener product to form a roll.

78. The method of claim 76, wherein the second array of fastener elements comprise piles of a carpet.

79. The method of claim 76, wherein the step of positioning the second array of fastener elements adjacent the preformed substrate comprises stacking discrete lengths of the fastener product to form a stack.

80. The method of claim 76, wherein the first array of fastener elements comprise thermoplastic resin, the preformed substrate being attached to resin forming the heads of the first array of fastener elements without use of an adhesive.